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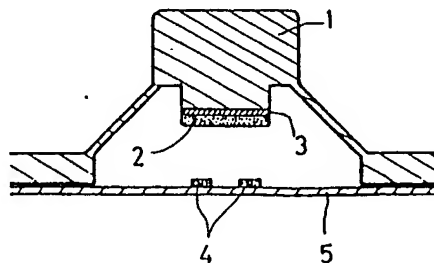
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(54) CONTACT RUBBER.

(57) A structure of a contact rubber used for various kinds of electronic appliances, and to preventing an oily substance which has penetrated into the contact rubber from the outside, or which is contained in the same rubber from coming out to the surface of a conductive portion of said rubber to thereby inhibit an increase in the contact resistance value of the conductive portion. The conductive portion (2) is formed on a key top (1), which is molded from an insulating rubber into the shape of a dome, via an oil-proof portion (3) formed of a layer of an oil-proof rubber or a resin film.

Fig. 1



SPECIFICATION

Title of the Invention

CONTACTOR RUBBER

Background of the Invention

1. Field of the Invention

The present invention relates to a structure of contactor rubber in a switching means of, such as, key board for various electronics devices, such as, electronic portable computers, digital watches, word processors, personal computer, video disc arrangements, audio instruments, push-phone and so on, said contactor rubber serving as an interconnector between the electrodes of, such as, printed circuit board, LSI-chips etc.

2. Description of the Prior Art

There have been known contactor rubbers, in which the conduction part thereof consists of an electroconductive rubber prepared by dispersing carbon powder in a mass of electrically insulating rubber, bonded under vulcanisation with an electroinsulating rubber; in which the surface of an electroinsulating rubber is printed with an electrically conductive ink; and so on.

Brief Summary of the Invention

A contactor rubber is employed in manipulator key for key operation of, such as, switching key board etc., and is arranged bodily with the key top for finger touch to effect key input. Upon such a finger touch onto the key top, fats or organic acid esters on the human finger will be transferred to the key top, which will penetrate through the material of key top and, after a prolonged period of time has been elapsed, reach to the contactor rubber and deposit thereon to cover it, increasing thereby the contact resistance upon contact of the contactor rubber with the pairing contact member. Also, oils and lower molecular weight siloxanes contained in the resin material of key top may separate and deposit on the conduction part, to thereby facilitate further the increase in the

contact resistance and may even hinder the electric conduction in an extreme case.

By the present invention, it is contemplated to prevent deposition of insulating substances, such as, oils, lower siloxanes and fats and esters from human finger onto the conduction part of the contactor rubber, by inserting between the conduction part and the resin body of the key top an oil-resistant layer.

Thus, the invention proposes to arrange an oil-resistant layer inserted between the conduction part and the resin body of the key top. By incorporation of such an oil-resistant insertion layer, any deposition or penetration of electroinsulating substances from the environment or from the human finger can be prevented, even though the key board is placed in a factory or in a cooking room etc. where the atmosphere is contaminated with oily mists.

For incorporating an oil-resistant layer, measures may be taken into consideration, in which a film of resin is interposed between the insulating resin body of the key top and the electroconductive rubber layer, in which said resin film is arranged between two electroconductive rubber layers, in which a layer of oil-resistant rubber is disposed over the electroinsulating key top body, and so on.

If the oil-resistant layer is placed between two electroconductive rubber layers, it is possible that only these electroconductive layers are molded separately and are bonded afterwards onto the contactor rubber body with an adhesive to form an integral body. This is advantageous, since the adhesion work of the electroconductive layers onto the contactor rubber body can be effected without paying attention whether the face of the electroconductive layer is upside-down, permitting thus an easier work.

Brief Description of the Drawings

Fig. 1 shows one example of an arrangement according to the present

invention in a vertical section.

Fig. 2 is another example of the present invention shown also in a vertical section.

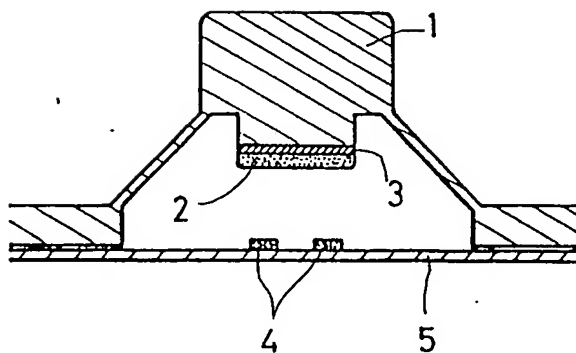
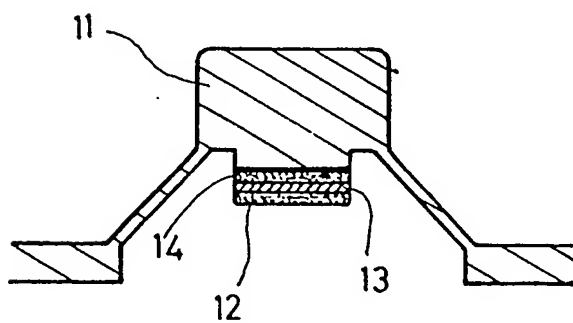
Detailed Description of Preferred Embodiments

In Fig. 1, a key top of a key board has on its bottom face a layer of electroconduction part 2 under an interposition of an oil-resistant layer 3. 4 is an electrode on a printed circuit board substrate 5. The key top 1 is prepared by molding an insulating rubber. On the underside of the key top 1 projecting downwards, an oil-resistant layer 3 is disposed by printing thereon with an oil-resistant substance derived from a non-vulcanized silicone rubber, such as those in which halogen or an organic compound is grafted on the principal siloxane polymer chain, or so on (such as fluorosilicone rubber, NBR, fluoride rubber, acrylic rubber, epichlorohydrin rubber etc.), and the surface of this oil-resistant layer 3 is further provided with an electroconductive layer 2 formed by printing an electroconductive ink thereon. Of course, it is possible to incorporate oil-resistant layer by inserting it therebetween.

In Fig. 2, which illustrates another embodiment of the present invention, the bottom face of the key top body 11 is provided with an electroconductive layer 14, an oil-resistant layer 13 and a further electroconductive layer 12. The inner most electroconductive rubber layer 14, the resin film 13 and the outermost electroconductive rubber layer 12 are prepared separately each in a form of film, from which the respective sheet pieces are cut out by punching them in a predetermined shape, which are then bonded on the bottom face of the key top body 1 by an adhesive in the sequence mentioned above.

What is claimed is:

1. A contactor rubber in which the electroconductive part thereof is arranged under an interposition of an oil-resistant layer on the bottom face of a key top molded from an electroinsulating rubber.
2. A contactor rubber according to Claim 1, wherein the oil-resistant layer consists of an oil-resistant rubber.
3. A contactor rubber according to Claim 1, wherein the oil-resistant layer consists of a synthetic resin film.

$\frac{1}{1}$ *Fig. 1**Fig. 2*

INTERNATIONAL SEARCH REPORT

0233296

International Application No. PCT/JP86/00419

I. CLASSIFICATION OF SUBJECT MATTER (If several classification symbols apply, indicate all) *		
According to International Patent Classification (IPC) or to both National Classification and IPC		
Int.Cl ⁴ H01H1/06, H01H13/52		
II. FIELDS SEARCHED		
Minimum Documentation Searched *		
Classification System	Classification Symbols	
IPC	H01H1/06, H01H13/52, H01H13/70	
Documentation Searched other than Minimum Documentation to the extent that such Documents are included in the Fields Searched *		
Jitsuyo Shinan Koho 1926 - 1985 Kokai Jitsuyo Shinan Koho 1971 - 1985		
III. DOCUMENTS CONSIDERED TO BE RELEVANT **		
Category *	Citation of Document, ** with indication, where appropriate, of the relevant passages **	Relevant to Claim No. **
A	JP, U, 54-85375 (Casio Computer Co., Ltd.) 16 June 1979 (16. 06. 79) (Family: none)	1-3
A	JP, U, 56-26824 (Alps Electric Co., Ltd.) 12 March 1981 (12. 03. 81) (Family: none)	1-3
A	JP, B2, 59-29932 (Alps Electric Co., Ltd.) 24 July 1984 (24. 07. 84) (Family: none)	1-3
A	JP, A, 59-196517 (Brother Industries, Ltd.) 7 November 1984 (07. 11. 84) (Family: none)	1-3
<p>* Special categories of cited documents: **</p> <p>"A" document defining the general state of the art which is not considered to be of particular relevance</p> <p>"E" earlier document but published on or after the international filing date</p> <p>"I" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)</p> <p>"O" document referring to an oral disclosure, use, exhibition or other means</p> <p>"P" document published prior to the international filing date but later than the priority date claimed</p> <p>"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention</p> <p>"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step</p> <p>"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art</p> <p>"Z" document member of the same patent family</p>		
IV. CERTIFICATION		
Date of the Actual Completion of the International Search *	Date of Mailing of this International Search Report *	
October 30, 1986 (30. 10. 86)	November 17, 1986 (17. 11. 86)	
International Searching Authority *	Signature of Authorized Officer **	
Japanese Patent Office		